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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,540	01/03/2002	Takashi Nishikawa	740819-724	7353

7590 09/11/2003
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EXAMINER

MULPURI, SAVITRI

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
10/019,540

Applicant(s)
Nishikawa

Examiner
Savitri Mulpuri

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Am

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Jun 17, 2003
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above, claim(s) 1-4 and 14-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 4,5 6) ☐ Other: _____

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DETAILED ACTION

This action is in response to the applicant's election of process claims 5-13, received on 6/17/03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-11, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manfra et al (US 2003/ 0030078A) .

Manfra et al discloses a method of making transistor by the following process steps: providing a (111) silicon substrate; treating the silicon substrate in nitrogen atmosphere; growing AlN layer on the silicon substrate in MBE first by opening Al effusion cell and then open the shutter of RF plasma nitrogen a growth temperature of 600 C; annealing AlN layer at 950 C to form gate insulator layer for transistor(see page 2, sections 0021-0025). Manfra et al inherently teach Al atom layer first and then N atom layer because Manfra et al exposing the silicon substrate to Al first. Manfra et al do not teach repeating the deposition of Al atom layer and nitrogen atom layer. However it would have been obvious to repeating the process to obtain specific thickness. In general, the transposition of process steps or splitting of one step into two,

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where processes are substantially identical or equivalent in terms of function, manner or result, was held to not patentably distinguish the process. *Ex Parte Rubin*, 128 USPQ 159(1959). In the present case the repeating of Al atom layer and N atom layer would give the same effect of thicker AlN layer.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manfra et al as applied to claims 5-11, 13 above, and further in view of Nishizawa et al (US 4,939,571).

Manfra et al does not teach forming gate insulating layer with combination silicon nitride and aluminum nitride layer. Nishizawa et al teaches gate insulating layer with mixture of silicon nitride layer and aluminum nitride layer see col.3, lines 36-39). It would have been obvious to one of the ordinary skill in the art to form combination of silicon nitride and aluminum nitride layer because Nishizawa gives a choice of either AlN alone or composite layer of silicon nitride and aluminum nitride layer as art recognized equivalents.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is 703-305-5184. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956).

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SAVITRI MULPURI
PRIMARY EXAMINER
